

CLAIMS

What is claimed is:

1 1. A method of advancing a mining machine including an advancing machine,

2 comprising:

3 bracing the advancing machine within a mine opening;

4 moving the mining machine away from the advancing machine;

5 releasing the advancing machine; and

6 moving the advancing machine toward the mining machine.

1 2. A method according to claim 1, wherein said bracing includes bracing the advancing
2 machine between a roof and a floor of said mine opening.

1 3. A method according to claim 1, wherein said bracing includes bracing the advancing
2 machine between walls of said mine opening.

1 4. A method of steering a mining machine having a plurality of sides and having an
2 advancing machine operatively connected thereto, comprising:

3 bracing the advancing machine within a mine opening; and

4 increasing a distance between the advancing machine and the mining machine by
5 different amounts on two of the plurality of sides.

1 5. A method according to claim 4, wherein said bracing includes bracing the advancing
2 machine between a roof and a floor of said mine opening.

1 6. A method according to claim 4, wherein said bracing includes bracing the advancing
2 machine between walls of said mine opening.

1 7. A method of retrieving a mining machine including an advancing machine,

2 comprising:

3 bracing the advancing machine within a mine opening;

4 moving the mining machine toward the advancing machine;

5 releasing the advancing machine; and

6 moving the advancing machine away from the mining machine.

1 8. A method according to claim 7, wherein said bracing includes bracing the advancing

2 machine between a roof and a floor of said mine opening.

1 9. A method according to claim 7, wherein said bracing includes bracing the advancing

2 machine between walls of said mine opening.

1 10. An apparatus for advancing and steering a mining machine, comprising:

2 an advancing machine;

3 a brace coupled to said advancing machine and being extendable to brace said

4 advancing machine within a mine opening; and

5 an extender operatively coupled between said advancing machine and the mining

6 machine and capable of extension and retraction.

1 11. An apparatus according to claim 10, further comprising a second extender operatively

2 coupled between said advancing machine and the mining machine and capable of extension

3 and retraction.

1 12. An apparatus according to claim 10, wherein said brace comprises a hydraulic

2 cylinder.

- 1 13. An apparatus according to claim 10, wherein said extender comprises a hydraulic
2 cylinder.
- 1 14. An apparatus according to claim 10, wherein said brace and said extender comprise
2 electrical actuators.
- 1 15. An apparatus according to claim 10, wherein said brace is extendable to brace said
2 advancing machine between a roof and a floor of said mine opening.
- 1 16. An apparatus according to claim 10, wherein said brace is extendable to brace said
2 advancing machine between walls of said mine opening.
- 1 17. A method of navigating a mining machine including an advancing machine,
2 comprising:
3 bracing the advancing machine within a mine opening;
4 bracing the mining machine within said mine opening;
5 determining a first relative position of the advancing machine and the mining
6 machine;
7 releasing the mining machine;
8 moving the mining machine away from the advancing machine;
9 bracing the mining machine;
10 determining a second relative position of the advancing machine and the mining
11 machine;
12 releasing the advancing machine; and
13 moving the advancing machine toward the mining machine.

1 18. A method according to claim 17, wherein said determining of relative positions
2 includes measuring at least two variable dimensions between the advancing machine and the
3 mining machine.

1 19. An apparatus for navigating a mining machine comprising:
2 an advancing machine;
3 a first brace coupled to said advancing machine and being extendable to brace said
4 advancing machine within a mine opening;
5 an extender operatively coupled between said advancing machine and the mining
6 machine and capable of extension and retraction; and
7 a distance measurer operatively coupled to measure at least two dimensions between
8 the mining machine and said advancing machine.

1 20. An apparatus according to claim 19, further comprising a second brace coupled to the
2 mining machine and being extendable to brace the mining machine within said mine opening.

1 21. An apparatus according to claim 20, wherein said distance measurer comprises a
2 rotary potentiometer.

1 22. An apparatus according to claim 20, wherein said distance measurer comprises a
2 linear potentiometer.

1 23. An apparatus according to claim 20, wherein said distance measurer is an integral part
2 of said advancing machine.

1 24. An apparatus according to claim 20, wherein said extender comprises an electrical
2 actuator.

1 25. An apparatus according to claim 20, wherein said extender comprises a hydraulic or
2 pneumatic cylinder.

1 26. A method of conveying material from a remote mining machine having a longitudinal
2 axis using conveying units, each unit having a traction element, comprising:
3 assembling at least some of the conveying units into a conveying assembly; and
4 engaging at least some of the traction elements of the conveying units of said
5 conveying assembly to move said conveying assembly.

1 27. A method according to claim 26, wherein said engaging includes providing a driving
2 force to each of the conveying units of said conveying assembly.

1 28. A method according to claim 27, wherein said providing includes providing a
2 synchronized driving force to each of the conveying units of said conveying assembly.

1 29. A method according to claim 26, wherein said assembling includes connecting the
2 conveying units of said conveying assembly to substantially prevent rotation between
3 adjacent conveying units about the longitudinal axis.

1 30. An apparatus for conveying material from a remote mining machine having a
2 longitudinal axis, comprising:
3 a conveying assembly comprising a plurality of conveying units; and
4 a connector coupling adjacent ones of said conveying units so as to substantially
5 prevent rotation between said adjacent conveying units about the longitudinal axis.

1 31. An apparatus according to claim 30, wherein at least some of said conveying units
2 include a propelling device.

1 32. An apparatus according to claim 31 wherein said propelling device comprises
2 powered wheels.

1 33. An apparatus according to claim 31, further comprising at least one common drive
2 shaft operatively coupled to said propelling device.

1 34. An apparatus according to claim 33, wherein a plurality of said conveying units
2 include a propelling device and said at least one common drive shaft is operatively coupled to
3 each of said propelling devices.

1 35. An apparatus according to claim 33, further comprising a power unit located at a
2 discharge end of said conveying assembly operatively coupled to drive said at least one
3 common drive shaft.

1 36. An apparatus according to claim 33, further comprising a power unit located at a feed
2 end of said conveying assembly operatively coupled to drive said at least one common drive
3 shaft.

1 37. An apparatus according to claim 33, further comprising a power unit located at a
2 discharge end of said conveying assembly and a power unit located at a feed end of said
3 conveying assembly, said power units being operatively coupled to drive said at least one
4 common drive shaft.

1 38. An apparatus according to claim 30, wherein said connector comprises:
2 a pin on a first conveying unit of said adjacent conveying units;
3 a fork positioned on a second conveying unit of said adjacent conveying units, said
4 fork able to engage and disengage said pin; and

5 a hook movably positioned on either said first or said second conveying unit and
6 having a first position, in which said hook couples said adjacent conveying units, while
7 allowing limited relative motion between said adjacent conveying units about an axis
8 substantially perpendicular to the longitudinal axis, and a second position, in which said hook
9 does not couple said adjacent conveying units.

1 39. An apparatus according to claim 38, wherein said fork has an opening with a size
2 greater than a size of said pin for allowing a limited relative motion between said adjacent
3 conveying units the longitudinal axis.

1 40. An apparatus according to claim 38, further comprising a spring operatively
2 connected to bias the position of said hook.